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Original Research Article

Weather Based Agromet Advisories for Enhancing the Production and Income of the Farmers

Gurupreet Singh Gandhi[1*], J.L. Chaudhary[1] and Kamlesh Kumar Sahu[2]

[1]Department of Agrometeorology, IGKV, Raipur, (C.G.), India
[2]Department of Agrometeorology, OUAT, Bhuneshwar (Odisa), India
**Corresponding author*

A B S T R A C T

Agricultural production depends upon many factors, of which weather is the major factor. Weather varies with space and time; hence, its forecast can help to minimize the farm losses through proper management of agricultural operations. The complete avoidance of all farm losses due to weather factor is not possible but it can be minimized to some extent by making adjustments through timely and accurate information of weather forecast. Weather forecast and weather based agromet advisories help in increasing the economic benefit to the farmers by suggesting them the suitable management practices according to the weather conditions. A study was, therefore, undertaken on adaptation of economic impact of agromet advisory services for wheat Rabi 2015-16 For assessing the impacts of agromet advisory services, users of agromet advisory services (AAS) and non-users of agromet advisory services (non AAS) were selected from different villages of Mahasamund district. Results showed that the farmers, who followed the agromet advisories, are able to reduce the input cost and increases in the net profit as compared to the non AAS farmers in wheat; this profit was due to the crop management done by the farmers according to agromet advisory services Thus, the application of agromet advisory services based on current and forecast weather is a useful tool for enhancing the production and income. It was observed that cost of cultivation comes down by 5.3 per cent by the farmers who follow AAS. Net cost: benefit ratio of AAS and non AAS farmers was found 1:1.31 and 1:1.19 respectively.

Keywords

Weather, Enhancing, Production, Farmers, Agriculture.

Introduction

The success or failure of agriculture crop production is mainly determined by the weather parameters. Weather manifests its influence on agricultural operations and farm production through its effects on soil and plant growth. Out of the total annual crop losses, a substantial portion is because of aberrant weather. The loss could be minimized by making adjustment with coming weather through timely and accurate weather forecasting. Agricultural operations can be advanced or delayed with the help of advanced weather forecast from three to ten days. An agriculturally relevant forecast is not only useful for efficient management of farm inputs but also leads to precise impact assessment (Gadgil, 1989). Weather is one of the most important factors determining success or failure of agricultural production. It effects on every phase of growth and development of plant. Any variability in the weather during the crop season, such as delay in the monsoon, excessive rains, flood, droughts, spells of too-high or too-low

temperatures would affect the crop growth and finally the quality and quantity of the yield. The losses in crop can be reduced by doing proper crop management in time by timely and accurate weather forecasts. Weather forecast also provides guidelines for selection of crops best suited to the anticipated climatic conditions. The objective of the weather forecasting is to advice the farmers on the actual and expected weather and its impact on the various day-to-day farming operations i.e. sowing, weeding, time of pesticides spray, irrigation scheduling, fertilizer application etc. and overall crop management. Weather forecast helps to increase agriculture production, reduce losses, risks, reduce costs of inputs, improve quality of yield, increase efficiency in the use of water, labor and energy and reduce pollution with judicious use of agricultural chemicals. Rathore *et al.*, (2001) discussed the weather forecasting scheme operational at National Centre for Medium Range Weather Forecast for issuing location specific weather forecast five days in advance. Damrath *et al.*, (2001) reported that the statistical interpretation methods are used to increase the reliability of the precipitation forecast. The benefit by the farmers using agromet advisory bulletin and weather forecast for making farm level decisions by farmers from different village have been discussed in this paper.

Materials and Methods

The present study was purposely conducted in Mahasamund block of the same district under AICRPAM-NICRA project. It can be observed from Table 1 that out of 100 farmers were selected for study purpose. Among the selected farmers 50 farmers follow agro advisory services (AAS) and 50 farmers do not follow AAS provided by AICRPAM-NICRA project from two intentionally selected villages namely Malidih and Jhalkhamariya under this project NICRA-AICRP on agrometeorology. Primary data was collected from selected agro-advisory service (AAS) farmers of neighboring villages and non AAS farmers of neighboring villages. Data was collected through personal interview method with the help of pre-tested questionnaires. The growers were classified as marginal (up to 1 ha), small (up to 2 ha), medium (2.01-4 ha) and large (above 4 ha) categories as per criterion followed by Marothia, 1986. The detailed enquiry was done in the *kharif* season of 2015. To estimate the cost of cultivation of selected paddy crop of different categories of farmers, whole data is divided into two major parts, *i.e.*, variable cost and fixed cost. Variable cost includes land preparation, cost of seed and sowing, fertilizer and manuring, cost of intercultural operations, irrigation, plant protection materials, harvesting etc. Fixed cost carries rental value of land and interest on working capital. Different cost concept (cost A, cost B and cost C) analysis is made using these data to calculate the cost and returns of AAS and non AAS farmers of paddy crops as per standard procedure laid down by George *et al.*, 1972

Economic analytical tool

This includes the detailed analysis of costs and returns.

Total input

It includes all the cash and kind expenses as detailed below:

a-1 Wages of hired labour paid in cash or kind.

a-2 Imputed wages for the farmer and his family used in crop and livestock production.

a-3 Value of seed, manure and fertilizers and other cash expenses.

a-4 Repairs to dead stock.

a-5 Depreciation on deadstock and livestocks.

a-6 Interest on fixed and working capital.

a-7 Rent of land whether rented or owned

a-8 Irrigation charges.

Total output

The quantity of product produced for different crops and livestock enterprises was treated as the total output.

When the output is multiplied by its price then it is the output value (Banafar and Singh 1998).

Net income

It is the difference between total receipts and total expenses. It includes the pay of the farm manager and interest on capital invested in the business. It will be calculated as:

Net income = Gross income – Total expenses

Input –output ratio

It can be expressed as the ratio of output to input. The ratio is calculated as:

Input-output ratio = O/I

Where,

I = Net cost of cultivation and
O = Net return

Cost of production per quintal (Rs.qt.$^{-1}$)

It refers to total input cost (in Rupees) divided by output (in Quintals) (Shrivastava, 1990).

Cost concept

The cost of production of different crop has been presented in terms of cost A.

Cost $A_{1,}$ Cost B and cost C. The cost concepts are given below (Niharika, 2012).

Cost A

Value of hired human labour (permanent and casual)

Value of owned bullock labour

Value of hired bullock labour

Value of owned machinery

Hired machinery charges

Value of fertilizers

Value of manure (owned and purchased)

Value of seed (farm produce and purchased)

Value of insecticide and pesticide

Irrigation charges (both owned and hired)

Canal water charges

Land revenue and other taxes

Miscellaneous expenses (artisans, ropes and repair to small farm implements).

Cost A_1: Cost A_1 + Rent paid for leased in land.

Cost B: Cost A_1 + Imputed rental value of owned land + interest on fixed capital

Cost C: Cost B + imputed value of family labour.

Results and Discussion

The economic benefit obtained by farmers following the Agro met has been evaluated for *Kharif* seasons for the period 2015. Total cost of cultivation, crop yield and net returns for rice crop grown by the AAS and non AAS farmers during *Kharif* season are presented in Table 1 and 2. The total cost of cultivation was found to be lower in the case of AAS farmers who have effectively adopted the ago-advisory compared to non AAS farmers. From the Table 1 it is observed that the AAS farmers are realized good benefit than non-AAS farmers. Similarly, even here also the yield and other returns were lower in case of non-AAS farmers compared to the AAS farmers. Similar observations were also reported by Singh *et al.*, (2004) and Venkataraman (2004). According to them the need for Agromet advisories and input requirements for Agromet advice on field operations, crop prospects and avoidance of pest and disease under adverse environment condition is essential. The economic benefit of the advisories for different Agromet field units that ranged between Rs. 330/ and 3750/ and 1410 to 1885/ hectare for maize, wheat and rice crop, respectively (Rana *et al.*, 2005) (Table 2). Fifty farmers who are aware of the agro advisory bulletins are utilizing AAB in operational farm management and all farm activities is 76% farmers rated the usefulness of forecast between good to excellent. Similarly, Ravindrababu *et al.*, 2007, reported that the forecasts were found to be encouraging and of benefit to the AAS farmers compared to non AAS farmers sampled It was observed that farmers who follow NICRA- AAS have average saving of 16.82% in manures and fertilizers, about 16.15% in weeding, about 17.43% in plant protection, 23.77% in irrigation and the overall saving during crop growing season is 6.61%. Manures and fertilizers saving could be done by AAS farmers as by following advice, saving in top dressing of urea was there. In plant protection also, a saving of Rs. 630/hectare was made mainly focusing on the cost saving in spraying of herbicides/insecticides. However harvesting, thrashing, winnowing and transportation costs are coming out to be almost same under both the systems. Linear equation has been drawn and it can be observed from the Figure 1 that cost towards various operations goes on decreasing during later part of the growing season. Major cost of production in rice crop is during initial stages.

Gross returns have been shown; therefore impact of agro-advisory services is clear with gross returns and net returns significantly higher Table 3. One term Cost of production (Rs./quintal) has been calculated for the main product grain and the production cost comes down with AAS services farmers by Rs. 79.54 per quintal mainly because of better management and efficient practices followed by AAS farmers. Net cost: benefit ratio of AAS and non AAS farmers was found 1:1.31 and 1:1.19 respectively.

The study has revealed that the information gathered through agro-advisory service has been very useful and helpful to the farmers. The farmers have started taking interest in accessing information on the management of crops. The rainfall and crops management have been the major aspects on which farmers interested to get information. Since the initial stage of the programme, sufficient numbers of farmers have been found to be benefitted through the agro-advisory service.

Hence, to provide the agro-advisory in a sustainable manner, convergence of such types of programmes with state department are technical help from Indira Gandhi Agricultural University along with KVKs personnel is recommended as it will help uplift livelihoods of the rural people in a rapid way.

Table.1 Number of households under different categories of selected villages in Mahasamund district

S.No		AAS Farmers			non-AAS farmers			
	Size Group	Numbers of Farmers		Total	Numbers of Farmers		Total	Grand Total
		M	**J**		**M**	**J**		
1	Marginal	4	5	**9**	10	6	**16**	25
2	Small	6	11	**17**	7	9	**16**	33
3	Medium	7	5	**12**	5	7	**12**	24
4	Large	8	4	**12**	3	3	**6**	18
	Total	25	25	**50**	25	25	**50**	**100**

M= Malidih J=Jhalkhamaria

Table.2 Average cost of cultivation of Wheat in different category of farms (Rs. / ha)

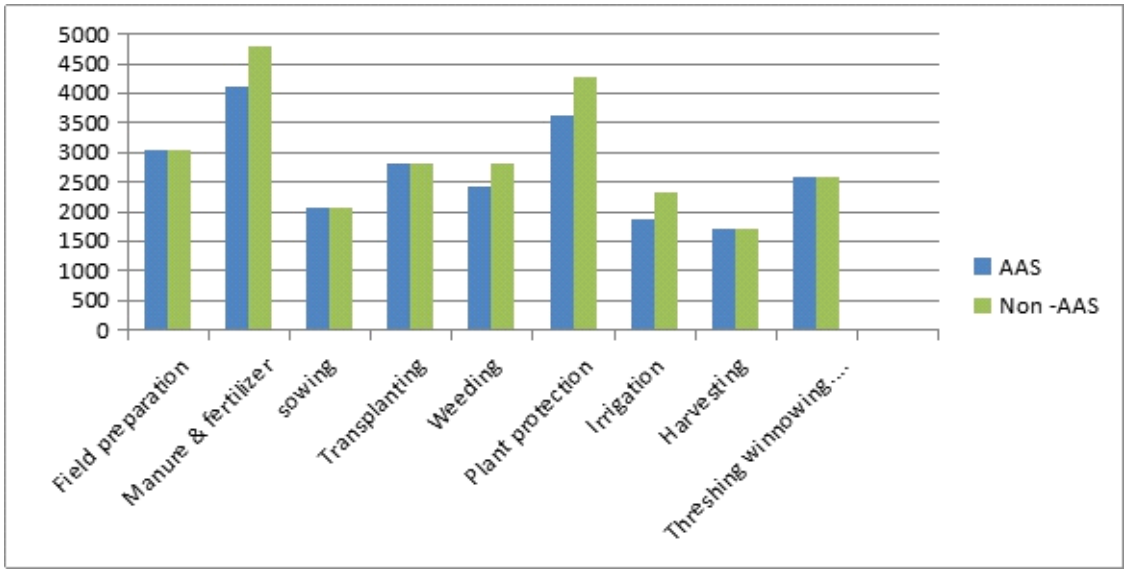
S.No	Particulars	Average cost with-AAS	Average cost with Non –AAS	Average saving with AAS	Percentage saving with AAS*
Variable cost					
1	Field preparation	2803.97	2803.22	0	0
2	Manure & fertilizer	3709.87	4215.69	506	13.63
3	Sowing	1764.75	1764.75	0	0
4	Weeding	997.65	1200.5	202.85	20.32
5	Plant protection	1290.5	1551.5	261	12.47
6	Irrigation	963	1276	313	22.11
7	Harvesting	1483.6	1483.25	0	0
8	Threshing, winnowing & transportation	2471	2471.5	0	0
	Sub Total	15384.34	16666.41	1282.07	8.33
(B) Fixed cost					
1	Land rent	8500	8500	0	0
2	Interest on working capital	153.84	164.16	10.32	
	Total fixed cost	8653.84	8664.16		
(C) A+B					
1	Total cost (A+B)	24,038.18	25,330.57	1292.39	6.61

* Percentage was calculated from with AAS data

Table.3 Cost of cultivation, product values and bi-product values

S.No.	Particulars	AAS farmers	Non- AAS farmers	Gross benefits with AAS
1	Input cost (Rs)	32,855.14	35,028.66	2173.52
2	Production (Qt./ha)			
	a. Main product	51.62	48.95	6.25
	b. By-product	64.25	65.62	-1.37
3	Price (Rs)			
	a. Main product	1390	1390	0
	b. By-product	55	55	0
4	Cost of production (Rs/qt)			
	a. Main product	636.48	716.02	79.54
	Return (Rs./ha)			
5	a. Main product	71751.80	68040.50	3711.30
	b. By-product	3533.75	3609.10	-121
6	Gross return (Rs./ha)	75285.55	71649.60	3635.95
7	Net Return	42430.41	36620.94	5809.47
8	Net cost benefit ratio	1:2.29	1:2.04	

Fig.1 Cost of cultivation with AAS and non-AAS farmers for various cropping operations



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